5-C CONSTRUCTION-RELATED AIR QUALITY IMPACTS: CONVEYANCE

FINAL ENVIRONMENTAL IMPACT STATEMENT

Brightwater Regional Wastewater Treatment System

APPENDICES



Final

Appendix 5-C Construction-Related Air Quality Impacts: Conveyance

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Introduction

King County has prepared a Draft Environmental Impact Statement (Draft EIS) and Final Environmental Impact Statement (Final EIS) on the Brightwater Regional Wastewater Treatment System. The Final EIS is intended to provide decision-makers, regulatory agencies and the public with information regarding the probable significant adverse impacts of the Brightwater proposal and identify alternatives and reasonable mitigation measures.

King County Executive Ron Sims has identified a preferred alternative, which is outlined in the Final EIS. This preferred alternative is for public information only, and is not intended in any way to prejudge the County's final decision, which will be made following the issuance of the Final EIS with accompanying technical appendices, comments on the Draft EIS and responses from King County, and additional supporting information. After issuance of the Final EIS, the King County Executive will select final locations for a treatment plant, marine outfall and associated conveyances.

The County Executive authorized the preparation of a set of Technical Reports, in support of the Final EIS. These reports represent a substantial volume of additional investigation on the identified Brightwater alternatives, as appropriate, to identify probable significant adverse environmental impacts as required by the State Environmental Policy Act (SEPA). The collection of pertinent information and evaluation of impacts and mitigation measures on the Brightwater proposal is an ongoing process. The Final EIS incorporates this updated information and additional analysis of the probable significant adverse environmental impacts of the Brightwater alternatives, along with identification of reasonable mitigation measures. Additional evaluation will continue as part of meeting federal, state and local permitting requirements.

Thus, the readers of this Technical Report should take into account the preliminary nature of the data contained herein, as well as the fact that new information relating to Brightwater may become available as the permit process gets underway. It is released at this time as part of King County's commitment to share information with the public as it is being developed.

Purpose

The Brightwater Conveyance System would transport wastewater to and from the treatment plant and would include the following primary components:

- Influent pipeline, primarily constructed in tunnels, for carrying untreated wastewater to the treatment plant
- Effluent pipelines, primarily constructed in tunnels, for carrying treated wastewater from the plant to the outfall
- Pump stations to lift the wastewater to higher elevations (depending on the alternative selected)
- Portals to support tunneling construction and to contain certain permanent facilities for operation depending on the conveyance alternative selected

This technical memorandum contains the following sections:

Brightwater Conveyance Alternatives – This section summarizes the alignment and portal locations for the three Brightwater Conveyance System alternatives.

Regulations and Criteria – This section summarizes federal and state regulations regarding air quality.

Impacts – This section describes the general air quality impacts that could occur during the construction of the Brightwater Conveyance System.

Mitigation – This section summarizes potential air quality impact mitigation measures that have been used for the construction of similar conveyance systems. These mitigation measures could be utilized for the Brightwater Project.

Brightwater Conveyance Alternatives

Three alternative conveyance system alignments are being evaluated for the Brightwater Project:

- Route 9–195th Street Conveyance System
- Route 9–228th Street Conveyance System
- Unocal Conveyance System

The alignments of these three conveyance system alternatives are shown in Figures 1, 2, and 3.

Because most of the Brightwater Conveyance System would be associated with tunnels located between 40 and 450 feet underground, potential air quality impacts would occur primarily at portal locations. Portals provide access from the ground surface for launching and receiving the equipment used to construct the conveyance system tunnels. Construction activities at the portals would last between one and five years, depending on the specific portal.

The portals have been designated as either primary or secondary. Primary portals are intended to be used and have been identified along each corridor at intervals of approximately 20,000 feet. Secondary portals may be required based on geotechnical analysis performed during final design; however, these portals are not expected to be used. A decision on the need for secondary portals will not be made until final design is completed. If needed, secondary portals may be used for temporary ventilation, ground improvement, and/or grouting supply. If required, secondary portals would be located within approximately 10,000 feet of another primary or secondary portal.

The portals and permanent portal facilities associated with the three Brightwater Conveyance System alignments are listed in Table 1.

 Table 1. Conveyance System Portals and Associated Permanent Facilities

Alternative	Primary Portals	Secondary Portals	Permanent Aboveground Facilities
Route 9-195th Street	5, 11, 19, 41,44	23, 27, 45, 7	Odor control facilities at Portals 11, 41, 44, 5
			Dechlorination at Portal 5
Route 9-228th Street	11, 19, 26, 33, 39, 41, 44	22, 24, 30, 37	Odor control facilities at Portals 11, 26, 41, 44
			Dechlorination at Portal 26
Unocal	3, 7, 11, 14	5, 10, 12, 13	Odor control facilities at Portals 11, 7, 14
			Pump station at Portal 11

Regulations and Criteria

The primary regulation governing air quality in the United States is the federal Clean Air Act (CAA) and its amendments. At the federal level, the CAA is administered by the U.S. Environmental Protection Agency (EPA). In Washington State, EPA has delegated its regulatory authority for air quality to the Department of Ecology (Ecology) and to regional clean air agencies. The Puget Sound Clean Air Agency (PS Clean Air Agency) is the agency with primary responsibility for Brightwater's air quality compliance.

The EPA promulgated National Ambient Air Quality Standards (NAAQS) for the following six pollutants known as "criteria" pollutants:

- Carbon monoxide (CO)
- Ozone (O₃)
- Nitrogen dioxide (NO₂)
- Sulfur dioxide (SO₂)
- Lead (Pb)
- Particulate matter (PM) (3 categories)
 - o with diameters less than 10 micrometers or less (PM₁₀)
 - o with diameters less than 2.5 micrometers or less (PM_{2.5})
 - Total suspended particulate (TSP)

When all criteria pollutant concentrations set forth by the NAAQS are met within a geographic area, the area is called an "attainment area." When the NAAQS is not met within a geographic area, the area is called a "non-attainment area." In the case of non-attainment areas, a plan to lower emissions to or below regulatory levels must be developed and implemented.

In the past, King and Snohomish Counties were "non-attainment areas" for CO and O₃. EPA redesignated the region as a "maintenance area" in October 1996 for CO, and in November 1996 for ground-level O₃. The Brightwater Project, therefore, is located in areas that are

currently designated "maintenance areas" for CO and O₃. In short, the air quality in the area is good, and focus of air quality regulatory efforts is to ensure that it remains the same for the future. The area that the Brightwater Project is in meets the NAAQS for the other pollutants and, therefore, is designated "attainment" for those pollutants.

EPA identified two categories for criteria pollutants: primary air standards and secondary standards. A primary standard addresses air quality necessary to protect the health of the citizenry, with an adequate margin of safety, and a secondary standard protects the citizenry from any known or adverse effects of criteria pollutants. The NAAQS air quality standards are listed in Table 2.

Table 2. National and State Ambient Air Quality Standards

Pollutant	Primary	Secondary	Washington State
Sulfur Dioxide (SO ₂₎			
3-Hour Average	None	0.5 ppm	
24-Hour Average	0.14 ppm	None	0.10 ppm
Annual Average	0.03 ppm	None	0.02 ppm
Particulate Matter with dia	meters less than 10 m	nicrometers or less	S (PM ₁₀)
24-Hour Average	150 μg/m ³	150 μg/m ³	150 μg/m³
Annual Average	50 μg/m ³	50 μg/m ³	50 μg/m³
Particulate Matter with dia	meters less than 2.5 r	nicrometers or les	s (PM _{2.5})
24-Hour Average	65 μg/m ³	65 μg/m ³	None
Annual Average	15 μg/m ³	15 μg/m ³	None
Carbon Monoxide (CO)			
1-Hour Average	35 ppm	None	35 ppm
8-Hour Average	9 ppm	None	9 ppm
Ozone (O ₃)		l	1
1-Hour Average	0.12 ppm	0.12 ppm	0.12 ppm
8-Hour Average	0.08 ppm	0.08 ppm	None
Nitrogen dioxide (NO ₂)		l	1
Annual Average	0.053 ppm	0.053 ppm	0.05 ppm
Lead (Pb)	1	1	•
Calendar Quarter Average	1.5 μg/m ³	1.5 μg/m ³	None

ppm=parts per million

 $\mu g/m^3$ = micrograms per cubic meter

Source: Washington State Department of Ecology (1999)

Washington State also has air quality standards that meet or exceed national air quality standards (Table 2). The most stringent standard would apply. For example, the National Standards would apply for PM_{2.5}, because there are no state PM_{2.5} standards. However, Ecology's total suspended particulate (TSP) standards would apply for the Brightwater Project – there are no federal standards.

The PM₁₀ refers to particulate matter less than or equal to 10 microns in diameter. Particles in this size range can potentially penetrate the deepest regions of the human lung and, therefore, are more of a public health concern than particles of larger size. Ambient air regulations for control of fugitive (uncontrolled) dust emissions are based on the fraction of released dust in the 10 micron particle-size range. Additionally, dust emissions are far more visible than motor vehicle emissions (assuming the vehicles are well maintained). Visible emissions are often a source of concern to the public.

There are few regulations limiting diesel emissions. However, diesel emissions are known to produce soot and small particulates that can affect human health and lower visibility throughout the region. Diesel-powered vehicles are responsible for large amounts of the microscopic soot that causes respiratory problems and smog-causing chemicals from motor vehicles. Operation of vehicles at the construction sites could lead to localized increases in diesel emissions.

Impacts

Air dispersion in the vicinity of the conveyance corridors is influenced by moderately hilly terrain with ridgelines that generally run from north to south. In the summer, the wind direction is generally northerly and in the winter the wind generally blows in a southerly direction. Local topography can potentially cause atmospheric inversions in areas located east of I-405 in the Woodinville/Bothell area. Facilities that are sited west of I-405 would be situated at generally higher elevations. Therefore, these facilities would have higher and more efficient dispersion due to the northerly and southerly winds. Onshore winds may be experienced by portals sited near the Puget Sound shoreline with wind currents generally in a north-south direction.

The potential likely air quality impacts from construction of the Brightwater Conveyance System include dust released from excavation of the portals and spoils loading operations at the portals. Dust in the air can degrade air quality and lead to the deposition of dust on property outside the construction site. In addition, contaminated soil, if encountered, can potentially release heavy metals and petroleum hydrocarbons into the environment.

Because most of the conveyance system would be located underground, the greatest potential for dust would occur during portal construction. Primary portals would potentially create more dust than secondary portals, because primary portals would require more excavation and exposed soil. Dump trucks would be used to remove soil from the portal excavation and the spoils from the tunnel. Wind blowing across stockpiles of excavated spoils may distribute dust in the area; however, this is a low probability because the material from the tunneling operation would likely be wet from groundwater.

Although construction may take place 24 hours per day, the greatest potential for dust would occur during the day, when most dump truck loading would take place. Soil excavated during nighttime construction activities would be stockpiled and removed after daybreak. The dump trucks would remove soil during excavation of the portal and the tunnels.

In addition to more dust in the air, construction activities can degrade air quality through exhaust from equipment and vehicles sources such as the following:

- Cars and trucks delivering supplies and construction workers to the portal sites could lead to more vehicle exhaust.
- The increased traffic delays, if they occur, could lead to more exhaust in the area.
- Diesel exhaust from construction vehicles (for example, dump trucks, tractors), trucks, and stationary construction equipment can degrade air quality. Diesel engines emit carbon monoxide, hydrocarbons, nonmethane hydrocarbons, oxides of nitrogen, and particulate matter.
- Asphalt pavement will temporarily emit vapors if hot asphalt is placed to provide access or storage surface.

Mitigation

The following are examples of control measures that could be implemented to decrease air quality impacts during construction:

- Pave or put gravel along construction roads, if needed, to eliminate travel along exposed dirt roads.
- Treat exposed dirt roads, if utilized, with water or a chemical dust suppressant.
- Routinely wash construction site exits which can become covered with mud and dust.
- Cover unpaved roads, if needed, with materials having low silt content (silt is very fine and dusts easily).
- Cover spoils piles with plastic to prevent evaporation of water and consequent drying of the soil if excavated spoils are to remain onsite for more than a day.
- Properly maintain construction equipment to minimize exhaust emissions.
- Encourage construction workers to carpool or use public transportation.

References

Puget Sound Clean Air Agency. Regulation I. Seattle, WA.

Washington State Department of Ecology. 1999. *Air Quality Trends in Washington*. Air Quality Program. Publication No. 00-02-011.





